Thermal Energy Transfer: **STRAND 1: Energy Transformations, 9.1 Energy cannot be created or destroyed; it can be converted from one form to another. D2. Explain how energy is transferred by conduction, CONVECTION and radiation**

EXAMPLE 1

To capture her students' interest in the upcoming lesson, Ms. Winkler began her 4-day unit on con with a film about rogue waves. Then, she led them into a class discussion about the movement of the upper layer of the ocean, its currents and the Earth's rotation. She prepared a lab that would simulate the Coriolus Effect (drawing a straight line on a rotating disc). She rotated to student groups, asked questions and checked their answers. Ms. Winkler concluded her first segment of the unit with a discussion about how their "data" matched real-life current deflection.

Over the next two days she led several student discussions about thermohaline currents, and she provided students with maps to illustrate the complexity of the ocean's conveyor belt.

EXAMPLE 2

Ms. Connors began her 7-day earth science unit with two activities. First, she and her students created a concept map to illustrate the relationships among the sun, ocean currents (convection), thermohaline circulation, climate and evaporation. Second, she had students complete the Nike Shoe Investigation (May 1990). It peaked students' curiosity as well as required them to utilize critical map skills and draw scientific conclusions about surface ocean currents (gyres).

She downloaded three versions of "Surface Ocean Currents to accommodate her 29 students' diverse reading levels *www.windows.ucar.edu/tour/link=/earth/Water/ocean_currents.html* She invited students to use the Test Rendering Protocol to deepen their understanding of the text. Finally, they discussed and made models to simulate the Coriolus Effect.

She invited students to speculate about water movement in the deeper part of the oceans. She showed a 10 minute Flash presentation about surface currents, thermohaline circulation, and upwelling.

Finally, she showed segments of "The Day After Tomorrow," a movie that depicts a world ravaged by an instant ice age touched off when global warming disrupts warm currents in the Atlantic Ocean She asked students to prepare an analysis of the movie's scientific accuracy.

- ❑ Content
- ❑ Assessment
- ❑ Grouping
- ❑ Introduction
- ❑ Teaching Strategies
- ❑ Learning Activities
- ❑ Resources
- ❑ Extensions
- ❑ Modification
- ❑ Products

Common Core and Differentiated Instruction

Name:

Date:

Curricular Component	Definition
Content (Standards)	Content is what we want students to know, understand, and do as a result of our curriculum and instruction. Standards must be "deconstructed" into learning targets (knowledge, reasoning, skill, product)

Best on the Web

Kentucky: Unpacking of the ELA CCSS
http://www.education.ky.gov/KDE/Instructional+Resources/Curriculum+Documents+and+Resources/English+Language+Arts+Deconstructed+Standards.htm

Kentucky: Unpacking of the Math CCSS
http://www.education.ky.gov/KDE/Instructional+Resources/Curriculum+Documents+and+Resources/Mathematics+Deconstructed+Standards.htm

Deconstruct Standings into Learning Targets:

Knowledge Targets	Reasoning Targets	Skill Targets	Product Targets

CCSS Mathematics: Standard 8- (Gr. 6-8): Students will understand and apply basic and advanced properties of functions and algebra

EXAMPLE 1

Ms. Stanwood introduced this beginning lesson on slope by explaining what students would learn: "Today we will learn about slope, which is an important concept in algebra. We will spend about three weeks on this unit and by the time we are finished with the unit, you will see how civil engineers, builders, surveyors, and landscapers use this concept in their work.

She invited students to arrange themselves in groups of four because they were about to begin a scavenger hunt about slope (www.quia.com). Small groups were a way of differentiating because they were responsive to students' individual questions. As groups, they were going to use the web to find the answers to the following questions:

–What is slope?

–What letter of the Greek alphabet is used to represent slope?

–If a line rises from let to right is the slope positive or negative?

–What is the slope of a vertical line? Horizontal line?

While students were working, she rotated among the groups, responded to questions, and listened to students' questions. Later in the period, Ms. Stanwood assigned them some homework, which she knew would help students internalize the concept of slope and answer that arose in their small group work.

EXAMPLE 2

Mr. Grenke prepared to begin a 3 week algebra unit on slope with his 8th graders. From past experiences, he anticipated that there would be critical differences among his students with respect to conceptual understanding and abstract thinking, so he gathered a variety of resources as he planned his teaching strategies. He would begin with a motivating problem, that could "double" as a hook: "How Steep Can a Ramp Be?" (www.figurethis.org) He would listen carefully to students' mathematical discourse about the problem to diagnose students' foundational understanding and misconceptions. Based upon his diagnosis, he would initially divide the students into two groups: those who had incomplete or missing foundational concepts and those who already had some knowledge of the concepts and skills.

For the first group, he would scaffold mini-lessons around the concepts students didn't know. He might use a geoboard applet (www.enc.org) that allows students to use virtual elastics and pegs to draw conclusions about rise and run. He would use **demonstration, the concept attainment model, Socratic questioning** and **feedback** to support the first group's learning.

He went on the web and located another real-world problem related to slope that would extend the second group's understanding of slope and rate of change: "The Lost House Keys." (http://mathcentral.uregina.ca) Working in a small group, he would invite students to discuss and answer a series of open-ended questions: What is this problem about? What are some of the factors that are important when you set up the ladder? What is causing the steepness if the ladder to change? What is the relationship between the amount of vertical distance covered with respect to that covered by the horizontal distance? How is this problem similar/different to the one done by the whole class? Can rise and run be expressed mathematically? What new questions do I/we have? He planned to use **Socratic questioning** and **feedback** to support the second group's learning.

Based upon student learning at the outset of this lesson, he would reevaluate group membership before proceeding with the next phase of the lesson, determine their learning needs and the best teaching strategy to support their learning.

Curricular Component	Definition
Resources	• Resources are materials that support learning during the teaching and learning activities. • These resources will be varied to accommodate student differences, reading comprehension levels, learning preferences, and interests. • Resources should include print and non print sources, internet, and human resources.

Curricular Component	Definition
Grouping Strategies	• Well-designed grouping strategies are aligned with the learning goals. • Effective grouping strategies are varied and change frequently to accommodate students' interests, questions, learning preferences, prior knowledge, or learning rate and zone of proximal development. • Group membership changes frequently based upon learning goals and assessment of student learning

Gr. 1 Addition & Subtraction

CC.1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.

EXAMPLE 1

Katie Martin prepared to teach her 1st grade students about the sums of two one-digit numbers. She gathered together gummed stars in two colors and construction paper. She gave pairs of students construction paper on which she had written an addition fact. Each child was asked to display an addend with different colored stars and then the pair was asked to add all the stars by counting on from the greater number of stars. The students displayed all their work to make a "sky" full of addition facts .

EXAMPLE 2

Ms. Brennan knew from her preassessment that her grade one students were at very different developmental levels with respect to their understanding of addition. Of two one-digit numbers. One group of students needed manipulates to visualize the addition and subtraction facts. They used manipulatives, like dominos, and counters to "count on." Another group was working on accuracy and speed with their facts. They worked in pairs to check each other's work. A final group, ready for more abstract thinking, was invited to use a 100s chart to note patterns among the columns and rows (e.g., 10s, 9s) and present their findings to the class.

- ❑ Content
- ❑ Assessment
- ❑ Grouping
- ❑ Introduction
- ❑ Teaching Strategies
- ❑ Learning Activities
- ❑ Resources
- ❑ Extensions
- ❑ Modification
- ❑ Products

Curricular Component	Definition
Introductory Activities	An introduction sets the stage for a unit. Components may include: (1) a focusing question, (2) a needs assessment to determine students' prior knowledge, interests, (3) a "hook" to motivate students' (4) information about the relevance of the targets and unit expectations, (5) information about expectations for students, and (6) consideration of students' interests in or experiences that connect with the unit topic.

	Capture	Captivate	Close
1			
2			
3			
4			
5			

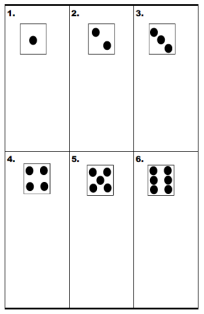
Curricular Component	Definition
Learning Activities	A unit's learning activities are those cognitive experiences that help students perceive, process, rehearse, store, and transfer knowledge, understanding, and skills.

Choice Boards (Breadth):

Tic Tac Toe,
Learning Menus
Show and Tell
RAFTS
Analytic, Practical, Analytic
Cubes/Thinkdots

Analytic	
Practical	
Creative	

Tic Tac Toe



SHOW			
TELL			

Role	Audience	Format	Topic

Tiered Assignments (Depth):

Entrée
1.
2.
3.

Side dishes
1.
2.
3.
4.

Desserts
1.
2.

Curricular Component	Definition
Modifications for Learner Need (Ascending the Level of Intellectual Demand)	Teachers can enhance learning by optimizing the match between the curriculum and students' unique learning needs. One kind of modification is referred to as "Ascending Levels of Intellectual Demand."

Curricular Component	Definition
Extension Activities	• Extension activities are preplanned or serendipitous experiences that emerge from learning targets and students' interests. • Provide for student choice. • Open-ended, authentic, generate excitement for and investment in learning.

Curricular Component	Definition
Products	• Products are performances or work samples created by students that provide evidence of student understanding and learning. • Products can represent daily or short-term student learning, or can provide longer-term culminating evidence of student knowledge, understanding, and skill. • High-quality products often double as assessment tools.

Curricular Component	Definition
Teaching Strategies (method, pedagogy)	• Teaching strategies are methods teachers use to introduce, explain, demonstrate, model, coach, guide, transfer, or assess in the classroom. • Aligned to learning targets • Promote student involvement • Provide support, feedback and scaffolding.

Direct Instruction and/or Lecture

Drill and Recitation

Concept Attainment

Socratic Questioning

Simulation

Inquiry Based Instruction/Learning

Project Based Learning (PBL)

Independent Study

- Significant Content
- 21st Century Skills
- In-Depth Inquiry
- Diving Question
- Need to Know
- Voice and Choice
- Revision and Reflection
- Public Audience

Best on the Web

http://www.bie.org/

http://wveis.k12.wv.us/

New World Explorers: Grade 8 CCSS Standards

- **STRAND 1.1 Significant events and themes in United States history.**
  - **–1. Analyze how specific individuals and their ideas and beliefs influenced U.S. history.**
- **STRAND 2.1 Access and gather information from a variety of primary and secondary sources including electronic media, recordings and text.**
  - **1. Gather information from multiple print and digital sources.**
  - **2. Cite specific textual evidence to support analysis of primary and secondary sources.**
  - **3. Determine the central ideas or information of a primary or secondary source and provide an accurate summary.**
  - **4. Analyze how a text makes connections among, and distinctions between, individuals, ideas, or events.**
  - **5. Conduct short and sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.**

Group A:

Using a teacher provided list of resources –primary and secondary—and a list of product options, show how two key explorers took chances, experienced success and failure, and brought about both positive and negative change to North America. Provide proof/evidence.

Group B:

Using reliable and defensible research, as well as primary and secondary sources, develop a way to show how the New World explorers were paradoxes. Include and go beyond the unit's principles.

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- ❑ Products

Curricular Component	Definition
Assessments	• Assessments are varied tools and techniques teachers use to determine the extent to which students have mastery of learning targets. • Inform instruction • Diagnostic, formative, summative • Aligned with learning targets.

	Selected Response	Extended Written Response	Performance Task Assessment	Personal Communication
Knowledge	Good	Good	Not so good – too time consuming	OK – but time consuming
Reasoning	Good (some reasoning)	Good	Good	Good
Skills	Not good	Not good	Good	Good (oral communication)
Products	Not good	Good (when written product)	Good	Not good.